



Six new species of the genus *Lepidostoma* Rambur (Trichoptera, Lepidostomatidae) from Japan

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Abstract

Six new species of *Lepidostoma* Rambur, Lepidostomatidae, are described from Japan: *L. pseudemarginatum*, *L. mennokiense*, *L. yunotaniense*, *L. yosakoiense*, *L. konosense* and *L. amagiense*. They live in small water flows, often hygropetric habitats, in mountain areas.

Key words: Trichoptera, *Lepidostoma*, new species, Japan, hygropetric habitat

Introduction

Lepidostoma Rambur 1842, Lepidostomatidae, is a large genus of Trichoptera distributed in all biogeographic regions except the Australasian region (Weaver 2002). In Japan, 36 named species have been recorded (Ito 2005). However, several undetermined species were collected from many localities in Japan (Uchida 2002; Nozaki personal communication; Hattori personal communication). In this paper, I describe 6 new species from Honshu and Shikoku, Japan. They live in small water flows, often hygropetric habitats, in mountain areas.

Methods

The association of adult and immature stages was established by rearing larvae to adults. When rearing larvae was impossible, association of male and female was based on similar general characteristics within specimens collected together. Male and female genitalia and some larval characters were figured after being cleared in hot diluted solution of KOH. Morphological terms mainly follow Ito (2001). The type series and other materials are deposited in the collections of the Natural History Museum and Institute of Chiba (CBM), Tochigi Prefectural Museum (TPM) and the author (TI) as indicated in parentheses. Specimens are preserved in 70–80% ethyl alcohol, unless otherwise indicated. Collecting methods and some collector names are abbreviated as follows: L, light trap; M, Malaise trap; S, net sweeping; MT, Mikio Takai; NK, Naotoshi Kuhara; TH, Toshio Hattori; TI, Tomiko Ito; TN, Takao Nozaki.

Lepidostoma pseudemarginatum sp. nov. (Fig. 1)

Diagnosis —This species is very similar to *L. emarginatum* (Ito 1985a), distributed in Honshu, Japan (Ito 2009), but it is readily distinguishable from it as follows: lateral arms of segment X of the male are round in this species, but subquadrate in *L. emarginatum*; abdominal gills of the larva are present only on the posterior rows of segments III–VI in this species, but present on both anterior and posterior rows of segments III–VI in *L. emarginatum*.

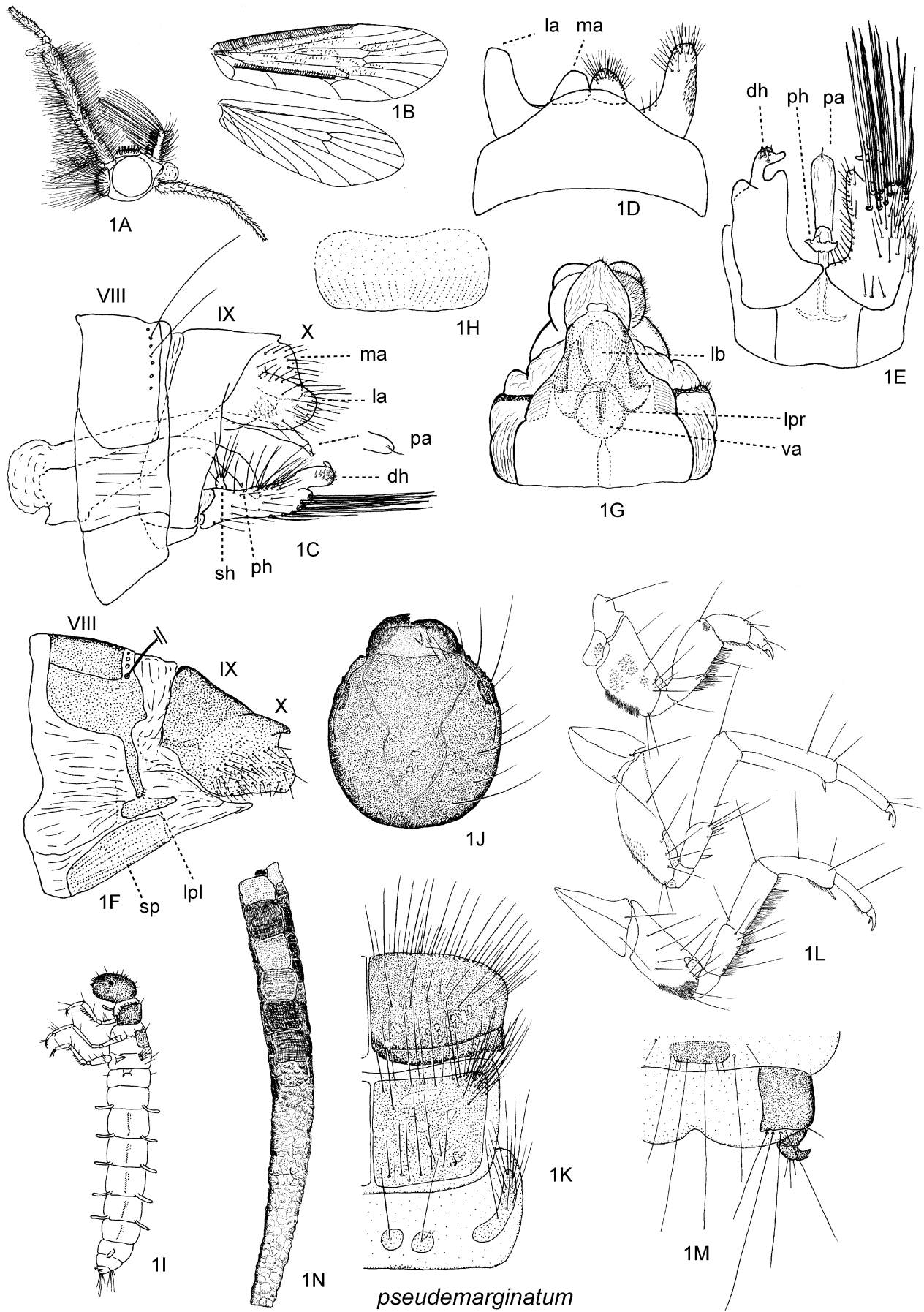
Description—Adult (Figs 1A–H). Brown to dark brown. Body 5.5–6 mm long in male and 6–6.5 mm long in female. Antennae: male—8 mm long, scapes thick and long, about 3 times as long as head, densely covered with long setae and scales; female—9 mm long, scapes long, about 3.5 times as long as head, covered with thin setae. Maxillary palpi: male—not segmented, densely covered with setae and scales; female—5-segmented covered with thin, short setae. Labial palpi 3-segmented, covered with thin, short setae in both sexes. Head with wart on vertex, pair of round warts each on dorsum, dorso-lateral and postero-lateral corners in both sexes; dorsal warts very large in male. In both sexes, pronotum with 2 pairs of round warts, each of mesoscutum and mesoscutellum with pair of subelliptical warts.

Wings elliptical. Forewing: male—7 mm long, covered with dark brown setae and scales, discoidal cell, thyridial cell and apical forks I and II present; female—7.5 mm long, covered with brown setae, discoidal cell, thyridial cell and forks I, II and V present. Hind wing: male—5.5 mm long, covered with dark brown setae, discoidal cell and apical fork I present; female—6 mm long, covered with thin setae, discoidal cell and forks I, II and V present.

Male genitalia (Figs 1C–E). Segment X composed of paired mesal arms, paired lateral arms and median membranous lobe. Mesal arms short, subtriangular in lateral and dorsal views. Lateral arms somewhat longer than mesal arms, broad and round, somewhat compressed dorso-laterally, directed postero-laterad, covered with setae and spinules; membranous lobe shorter than mesal arms and invisible in lateral view. Inferior appendages setose; each with main article rather thick, directed caudad, with about 10 thick, long setae on ventro-lateral surface; superior hook short, about 1/2 of basal width of inferior appendage in lateral view; dorsal hook thick, ax-like in ventral view, with several spinules on ventro-lateral surface. Phallicata thick at base and slender at apical 2/5. Paramere slender, weakly sclerotized, compressed dorso-ventrally at apical 1/4, with spindle-like sclerite apically.

Female genitalia (Figs 1F–H). Postero-lateral corners of tergite VIII strongly tapered, elongated ventrally and round apically. Lateral plates small, thin, and triangular. Subgenital plate very weakly sclerotized, trapezoidal, with slightly concave posterior margin. Tergites IX and X fused. Vaginal apparatus sclerotized weakly, pentagonal, with small triangular lateral projections; lateral bands broad and round apically.

FIGURE 1. *Lepidostoma pseudemarginatum* sp. nov. Male (A–E): A—head and basal parts of antenna, right lateral; B—right wings, dorsal; C—genitalia, left lateral; D—same, dorsal; E—same, ventral. Female (F–H): F—genitalia, left lateral; G—same, ventral, subgenital plate omitted; H—subgenital plate. Larva (I–M): I—left lateral; J—head, dorsal; K—thoracic segments, right half, dorsal; L—right thoracic legs, lateral; M—segments IX–X, dorsal. N—case of early period of final instar larva, left lateral. Abbreviations. Adult: VIII–X= 8th to 10th abdominal segments. Male: dh= dorsal hook; la= lateral arm; ma= mesal arm; pa= paramere; ph= phallicata; sh= superior hook. Female: lb= lateral bands; lpl= lateral plate; lpr= lateral projections; sp= subgenital plate; va= vaginal apparatus.



Final instar larva (Figs 1I–M). Length up to 8 mm. Head 0.95 mm wide, subequal to length, weak carina present at anterior 1/2 of dorsum, dark brown with few light dots at posterior end of fronto-clypeal apotome. Antennae each situated just anterior of periocular spot, short, as long as basal width. Pronotum concolorous with head, bearing about 30–35 setae on anterior margin and anterior half. Mesonotum lighter in color than head and pronotum, 8 setae on setal area (*sa*) 1, 7 setae on *sa* 2, and about 25 setae on *sa* 3. Metanotal area broadly membranous, slightly sclerotized at setal areas, 1 seta on *sa* 1, 3 setae *sa* 2 (2 setae on *sa* 2 transparent and very short), and about 10 setae on *sa* 3. Prosternal horn slender and short. Thoracic legs uniformly brown. Forelegs massive and shortest, middle legs longest. Trochantero-femoral brushes of fore- and hind legs composed of numerous setae. Dense patch of spinules present on distal end of each fore- and hind coxa. Many short spinules scattered at outer surface each of fore- and middle coxa. Single tracheal gills present subventrally and subdorsally on posterior region of abdominal segments II–VI. Other characters as in *L. emarginatum* (Ito, 1985a).

Case (Fig. 1N). Cylindrical, sand case for early instars, changing to 4-sided leaf case at final instar. Very smoothly surfaced. Length up to 14.5 mm.

Type series (CBM ZI). Holotype male: JAPAN: **Niigata**: Ikon-zawa, Kotaki, Itoigawa-shi (36°55' N, 137°51' E), 500 m above sea level, 30.V.1997 (larva), reared and emerged on 15.VIII–3.IX.1997, TI & TH (CBM ZI 136829). Paratypes: 1 male, 2 females, same data as holotype (CBM ZI 136830–136832).

Other specimens (TI). Honshu. **Niigata**: 3 males, 3 females, 2 pupae, 2 prepupae, same data as holotype, TI; 26 larvae, type locality, 8.VI.1996, TH; 6 larvae, type locality, 11.VI.1995, TH; 1 male, type locality, 16.IX.2003, TH, pinned. **Hyogo**: 1 male, Uwano, Kami-cho, 25.IX.2005, K. Inazu.

Etymology. The specific epithet indicates that this species is similar to *L. emarginatum*.

Habitat. Larvae live in small streams in mountain areas.

Distribution. Japan, Honshu (Niigata, Hyogo).

Japanese name. Nise-kammuri-kakutsutsu-tobikera.

Lepidostoma mennokiense sp. nov. (Fig. 2)

Diagnosis—This species is similar to *L. naraense* (Tani 1971) (Ito 1985b), which is distributed in 4 main islands of Japan (Ito 2009), but can be distinguished by the lack of an apical bifurcation in the male paramere, and by the presence of abdominal gills on the dorso-posterior corners of segment VII of the larva.

Description—**Adult** (Figs 2A–J). Dark brown. Length of body 5.5–6.5 mm in male and 6.5–7.5 mm in female. Antennae: male—7–7.5 mm long, scapes thick and long, about 5 times as long as head, each with protuberance present at 2/5 from base, basal 2/5 densely covered with setae and scales; female—7–7.5 mm long, scapes long, about 3.5 times length of head, without protuberances. Fore wings: 5.5–6.5 mm in male and 6.5–7.5 mm in female; hind wings 5–6 mm in male and 5.5–6 mm in female. Wing venation, maxillary and labial palpi, warts on head and thorax as in *L. pseudemarginatum* sp. nov. Male with dense setal row on apico-lateral 2/3 of middle femur.

Male genitalia (Figs 2D–G). Segment X composed of paired mesal arms, paired lateral arms and median membranous lobe. Mesal arms short, round in lateral view. Lateral arms developed, heavily sclerotized, directed ventro-caudad in basal 2/3, strongly curved dorsocaudad in apical 1/3; shape of apices variable individually and even between opposite sides of a specimen, bi- or tri-furcated in many specimens, but simply acute or with 1 reduced spine in few examples. Membranous lobe directed ventro-caudad, thick, long, as long as lateral arms. Inferior appendages setose, thick at basal

3/4 and thin at apical 1/4, round apically; each with superior hook long, as long as basal width of inferior appendage. Phallicata slender, membranous at apical 1/4. Paramere slender, strongly sclerotized.

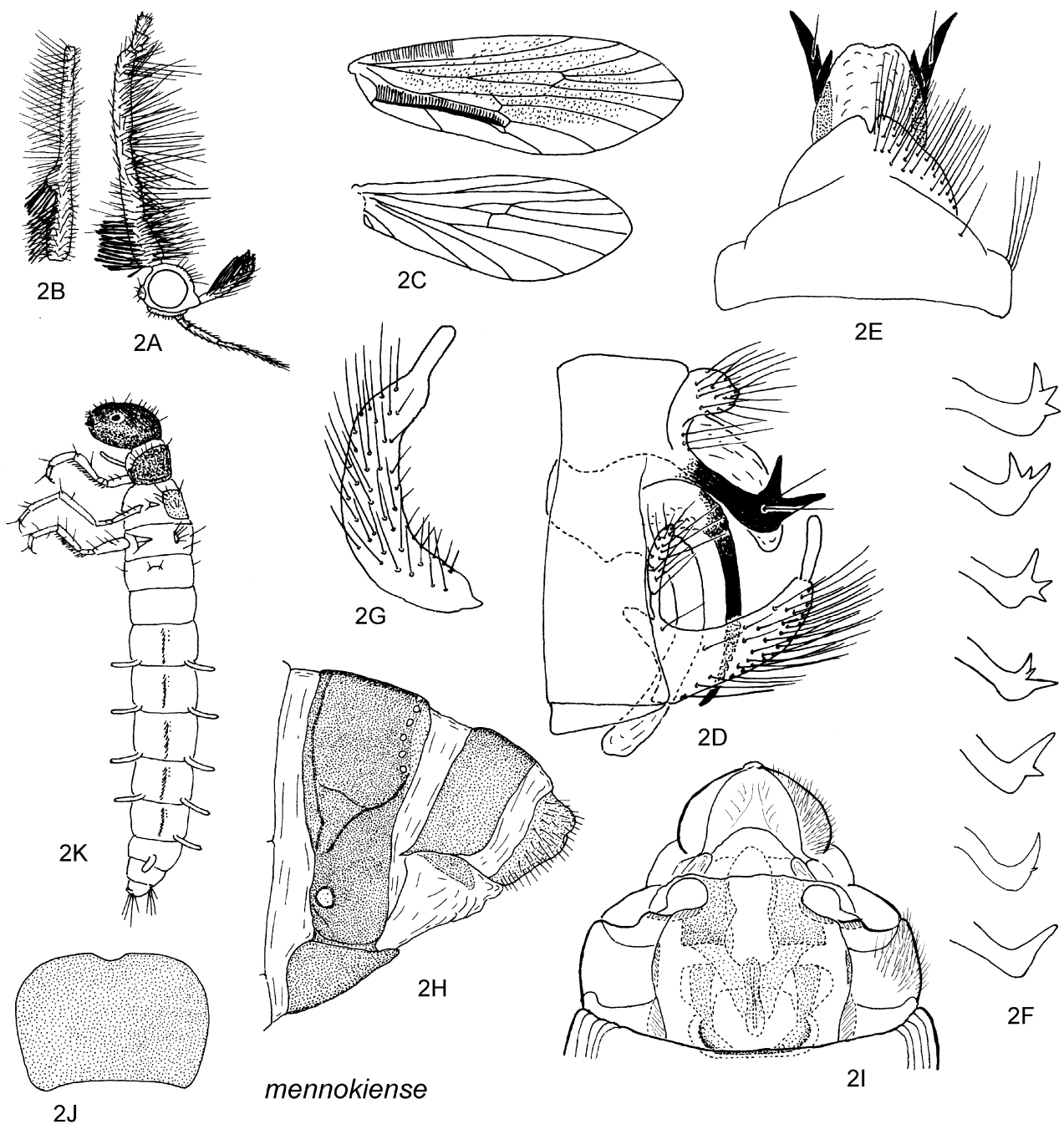


FIGURE 2. *Lepidostoma mennokiense* sp. nov. Male (A–G): A—head and basal parts of antenna, right lateral; B—right scape, dorsal; C—right wings, dorsal; D—genitalia, left lateral; E—same, dorsal; F—apical part of lateral arm of segment X, left lateral, variation; G—right inferior appendage, ventral. Female (H–J): H—genitalia, left lateral; I—same, ventral, subgenital plate omitted; J—subgenital plate. K—final instar larva, left lateral.

Female genitalia (Figs 2H–J). Lateral ends of tergite VIII broad. Paired lateral plates large, triangular. Subgenital plate sclerotized, subquadrate with slightly concave anterior margin, gently convex lateral margins and slightly convex posterior margin, with middle concavity shallow. Tergites IX and X separated. Vaginal apparatus very weakly sclerotized, with wide semicircular sclerite at

anterior margin and large round lateral projections; lateral bands broad, weakly sclerotized, subacute apically.

Final instar larva (Fig. 2K). Length up to 9 mm. Head 0.95 mm wide, carina absent. Number of setae on thorax: 20–24 on pronotum; 1, about 7 and about 20 on *sa1*, *sa2* and *sa3* of mesonotum, respectively; 1, 3 and about 10 on *sa1*, *sa2* and *sa3* of metanotum (2 setae on *sa 2* transparent and very short), respectively. Abdominal gills present as posterior subdorsal rows on segments III–VII and posterior subventral rows on segments III–VI. Other characters as in *L. pseudemarginatum* sp. nov.

Case. Cylindrical, sand case for early instars, changing to 4-sided leaf case at final instar. Length up to 9 mm.

Type series (CBM ZI). Holotype male: JAPAN: Honshu: **Aichi:** Mennoki-toge, Inabu-cho, Toyota-shi (35°11' N, 137°35' E), 1100 m, 14.VI.1991, TN (CBM ZI 136833). Paratypes: 1 male, 2 females, same data as holotype (CBM ZI 136834–136836).

Other specimens (TI). Honshu. **Aichi:** 6 males, 1 female, same data as holotype; 1 male, 1 female, 19 larvae, type locality, 27.V.1990, TN. **Yamanashi:** 1 female, Oyama-gawa, small stream, 750 m, Kajikazawa-shi, 9.VI.1996, TH; 2 males, 3 females, small stream near Kamanashi-gawa, 850 m, Shirasu-cho, 9.VI.1996, TH; 6 males, 3 females, *ibid.*, 1.VI.1997, TH & TI, S. **Shizuoka:** 1 male, Abe-toge, 1400 m, Umegashima, Shizuoka-shi, 6.VI.1999, TH; 1 female, *ibid.*, 10.VII.1991, TH; 4 males, 2 females, *ibid.*, 6.VI.1999, TH; 24 males, 6 females, *ibid.*, 1.VI.1999, TH & TI; 6 males, 7 females, small stream, 550 m, Yokozawa, Shizuoka-shi, 19.V.1996, TH; 6 males, *ibid.*, 3.V.2002, TH; 3 males, 1 female, *ibid.*, 21.V.2003, TH; 16 males, *ibid.*, 27.IV.2003, TH; 1 prepupa, *ibid.*, 25.V.2004, TH; 1 male, 2 females, 29 larvae, *ibid.*, 9.V.2005, TH; 2 prepupae, *ibid.*, 9.VI.2005, TH; 9 males, 4 females, Mitsumine, 1080 m, Yokozawa, Shizuoka-shi, 8.V.2005, TH; 8 males, 1 female, *ibid.*, 17.V.2005, TH; 2 males, Kamekubo-zawa, 400 m, Mizuiiro-gawa, Shizuoka-shi, 3.V.1995, TH; 1 female, Warashina-gawa, 300 m, Yunoshima, Shizuoka-shi, 7.V.1995, TH; 13 larvae, Ikawa-toge, 1500 m, Umegashima, Shizuoka-shi, 29.IV.1998, TH; 4 males, 1 pupa (male), small stream, 350 m, Hirano, Shizuoka-shi, 11.V.1996, TH; 11 males, Yoshizu, 100 m, Shizuoka-shi, 9.IV.2003, TH; 2 males, Yoshizu, 80 m, Shizuoka-shi, 21.V.2001, TH; 2 males, hygropetric habitat, Kuchisakamoto, 935 m, Shizuoka-shi, 29.IV.1998, TH; 1 male, Kangyo-mine, 1380 m, Ikawa, Shizuoka-shi, 2.VI.2003, TH; 1 female, Kami-chiai, 350 m, hygropetric habitat, Shizuoka-shi, 29.IV.1998, TH; 1 male, Yokimata-gawa, 350 m, Yonoshima, Shizuoka-shi, 11.IV.1998, TH; 1 male, small flow beside Suehiki-gawa, Izu-shi, 2.VI.2009, TH & TI, S; 3 males, small flows, Kazahaya-toge, Izu-shi, 3.VI.2009, TH & TI, S. **Kanagawa:** 1 male, Ikoino-mori, Hasuge-san, Aikawa-cho, 5.IV.2007, TN; 1 female, Nade, Mii, Tsukui-machi, 27.IV.1991, H. Moriya.

Etymology. The specific epithet refers to the type locality.

Habitat. Larvae of this species live in small streams in mountain areas where larvae of *L. naraense* are also often found.

Distribution. Japan, Honshu (Aichi, Shizuoka, Kanagawa).

Japanese name. Mennoki-kakutsutsu-tobikera.

***Lepidostoma yunotaniense* sp. nov. (Fig. 3)**

Goerodes sp. Uchida, 2002, 78.

Diagnosis.—This species is similar to *L. kantoense* (Ito 1994), distributed in the Kanto area, central Honshu of Japan (Ito 2009), but it is clearly distinguishable from *L. kantoense* as follows: mesal and

lateral arms of segment X of the male are subtriangular in this species, but subquadrate in *L. kantoense*.

Description—Adult (Figs 3A–H). Brown to dark brown. Length of body 5.5 mm in male and 6.5 mm in female. Antennae: male—7.5 mm long, scapes thick and long, about 4.5 times as long as head, each with basal half thicker than apical half and densely covered with long setae and scales; female—7.5–8 mm long, scapes long, about 4 times length of head. Forewing 6.5 mm in male and 7 mm in female; pentagonal cell present at apex of thyridial cell in male; hind wing 6 mm in male and 6.5 mm in female. Male with dense scale row on middle femur. Other characters as in *L. pseudemarginatum* sp. nov.

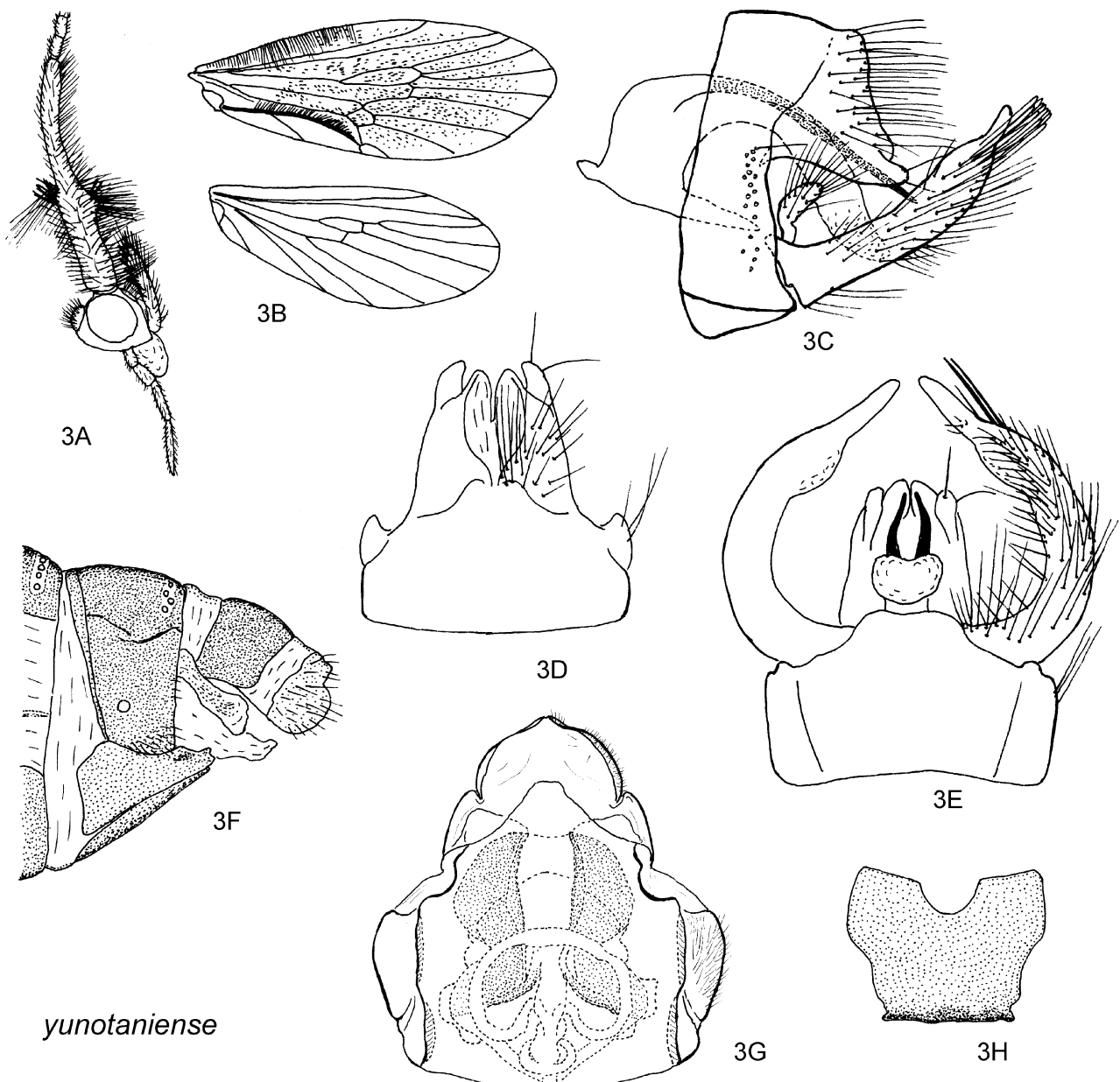


FIGURE 3. *Lepidostoma yunotaniense* sp. nov. Male (A–E): A—head and basal parts of antenna, right lateral; B—right wings, dorsal; C—genitalia, left lateral; D—same, dorsal; E—same, ventral. Female (F–H): F—genitalia, left lateral; G—same, ventral, subgenital plate omitted; H—subgenital plate.

Male genitalia (Figs 3C–E). Segment X composed of paired mesal arms, paired lateral arms and median membranous lobe. Mesal arms short, subtriangular in lateral view; lateral arms fused with mesal arms at basal 3/4, almost as long as mesal arms or slightly longer than the latter, with 2 setae apically; both pairs of arms directed ventrocaudad and round apically. Membranous lobe indistinct. Inferior appendages setose, thick at basal 4/5 and slender at apical 1/5, each semimembranous at mesal area of basal 3/5–4/5, subacute apically; superior hook relatively long, as long as basal width of inferior appendage, directed dorsad at basal 1/2 and curved dorsocaudad. Phallicata thick, membranous at apical 1/4. Paramere slender, strongly sclerotized.

Female genitalia (Figs 3F–H). Lateral ends of tergite VIII scarcely tapered. Lateral plates large triangular. Subgenital plate sclerotized, subsquare with middle of posterior margin deeply concave. Tergites IX and X separated. Vaginal apparatus weakly sclerotized lozenge with slender circular duct-like structure on the ventral side; lateral projections wide and short. Lateral bands very weakly sclerotized, rectangular.

Larva. Unknown.

Type series (CBM ZI). Holotype male: JAPAN: Honshu: small water, along R. 352, Yunotani-mura, Uonuma-shi, Niigata (37°11' N, 139°06' E), 480 m, 2.VI.2008, TI, S (CBM ZI 136837). Paratypes: 1 female, same data as the holotype (CBM ZI 136838).

Other specimens (TI and TPM). Honshu: **Niigata:** 1 female, same data as the holotype (TI); 1 male, 1 female, small stream near Sanashi-gawa, Yunotani-mura, Uonuma-shi, 4.VI.1993, NK (TI).

Tochigi: 2 males, 3 females, Nasu Imperial Villa, 1110 m, Yumoto, Nasu, Tochigi, 23.V.2000, T. Nakamura, pinned (TPM).

Etymology. The specific epithet refers to the type locality.

Habitat. Larvae live in small water flows beside hygropetric habitats in mountain areas where larvae of *L. robustum* (Ito 1984) are found.

Distribution. Japan, Honshu (Niigata, Tochigi).

Japanese name. Yunotani-kakutsutsu-tobikera.

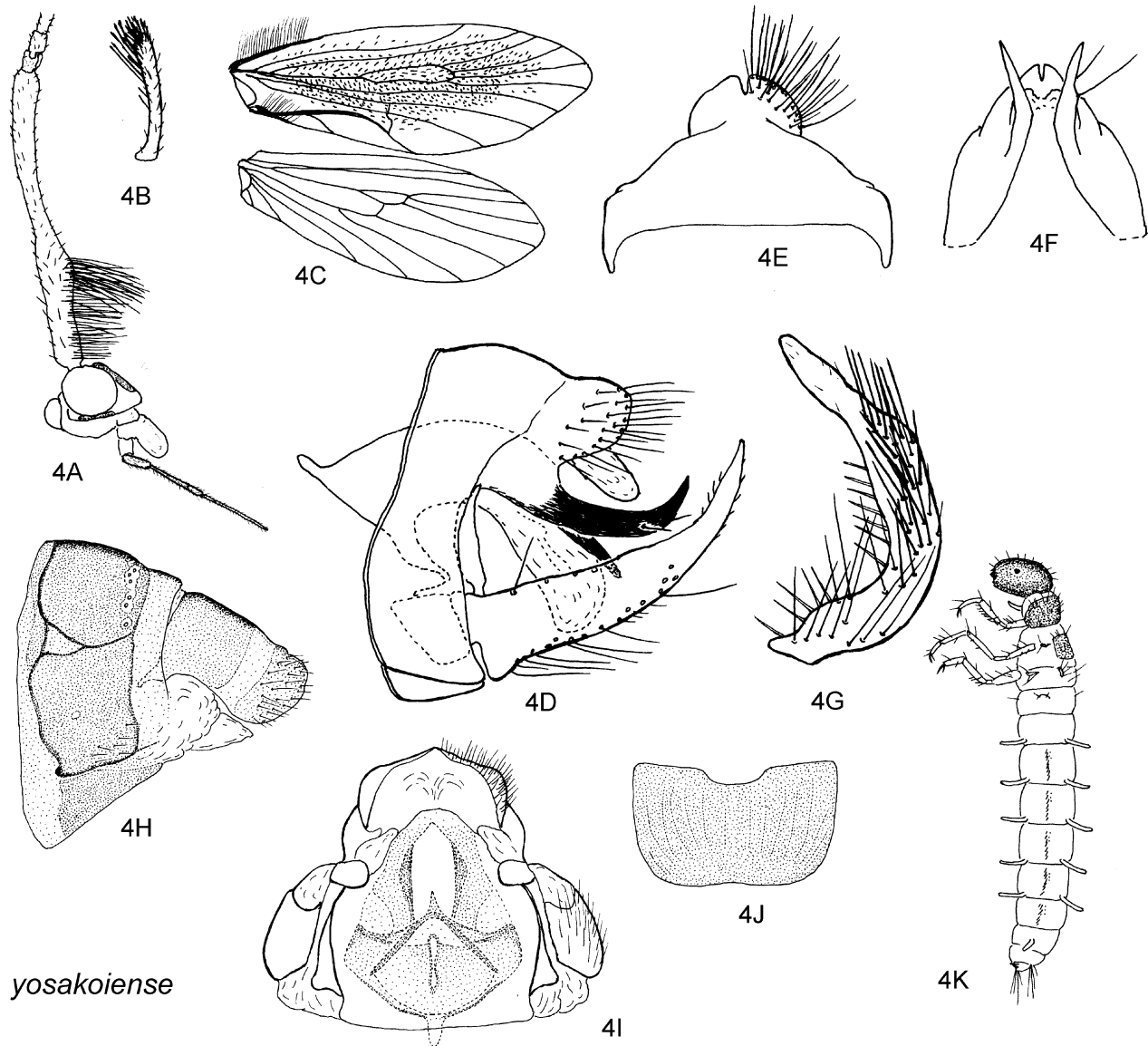
***Lepidostoma yosakoiense* sp. nov. (Fig. 4)**

Diagnosis—This species is similar to *L. naraense* (Tani 1971) (Ito 1985b), but clearly differs from it as follows: the apices of the lateral arms of segment X are directed dorsocaudad and the paramere is not bifurcated in this species, but the apices of the lateral arms of segment X are directed caudad and the paramere is bifurcated in *L. naraense*; in the larva, abdominal gills are present on dorso-posterior and ventro-posterior corners of segment VII in this species, but absent on the segment in *L. naraense*.

Description—**Adult** (Figs 4A–J). Brown to dark brown. Body 5–5.5 mm long in both sexes. In male, antennae 7 mm long, scapes dark brown, thick and long, about 5 times as long as head, each with extremely thick and long setae present at basal 2/5, other segments light brown, covered with thin, short setae. In female, antennae 7 mm long and covered with thin, short setae, scapes long, about 4 times length of head, color as in male. Forewings 7–7.5 mm long and hindwings 6–6.5 mm in both sexes. Male with dense scale row on anterior 1/2 of each middle femur. Wing venation, maxillary and labial palpi, and warts on head and thorax as in *L. pseudemarginatum* sp. nov. Maxillary palpi directed antero-dorsad and invisible in lateral view.

Male genitalia (Figs 4D–G). Segment X composed of paired mesal arms, lateral arms and median membranous lobe. Mesal arms short, round in lateral and dorsal views. Lateral arms developed, heavily sclerotized, directed postero-caudad basally, gently curved dorso-caudad at basal

2/3, with 2 setae subapically. Membranous lobe thick, length variable individually, from slightly shorter to distinctly longer than mesal arms. Inferior appendages each setose, long, apical 1/3 more slender than basal 2/3, subacute apically; superior hook thin, long, as long as 1.5 times basal width of inferior appendage. Phallicata thick, membranous at apical 1/2. Paramere slender, strongly sclerotized, slightly shorter than phallicata.



yosakoiense

FIGURE 4. *Lepidostoma yosakoiense* sp. nov. Male (A–G): A—head and basal parts of antenna, right lateral; B—right maxillary palpus, antero-lateral; C—right wings, dorsal; D—genitalia, left lateral; E—same dorsal; F—mesal and lateral arms and membranous lobe of segment X, ventral; G—right inferior appendage, ventral. Female (H–J): H—genitalia, left lateral; I—same, ventral, subgenital plate omitted; J—subgenital plate. K—final instar larva, left lateral.

Female genitalia (Figs 4H–J). Lateral margins of tergite VIII broad. Lateral plate large and triangular. Subgenital plate well sclerotized, subquadrate with slightly convex lateral margins, posterior margin with wide middle concavity. Tergites IX and X separated. Vaginal apparatus triangular, with wide, large, and subquadrate lateral projections. Lateral bands broad, weakly sclerotized, subacute apically.

Final instar larva (Fig. 4K). Length up to 6.5 mm. Head 0.80 mm wide, carina absent. Number of setae on thorax: 20–25 on pronotum; 1, about 7 and about 20 on *sa1*, *sa2* and *sa3* of mesonotum (2 setae on *sa 2* transparent and very short), respectively; 1, 3 and about 10 on *sa1*, *sa2* and *sa3* of metanotum, respectively. Abdominal gills present as posterior subdorsal and subventral rows on segments II–VI. Other characters as in *L. pseudemarginatum* sp. nov.

Case. Cylindrical, sand case for early instars, changing to 4-sided leaf case at final instar. Length up to 8 mm.

Type series (CBM ZI). Holotype male: JAPAN: Shikoku: **Kochi**: small flow near hygropetric habitat, near Yosakoi-toge, Hongawa, Kochi-shi (33°45' N, 133°10' E), 1200–1300 m, 20.V.2008, MT & TI, S (CBM ZI 136839). Paratypes. 2 males, 2 females, same data as holotype (CBM ZI 136840–13843).

Other specimens (TI). Shikoku. **Kochi**: 161 males, 84 females, 3 pupae 1 prepupa, type locality, 20.V.2008, MT & TI, S; 22 larvae, type locality, 26.XI.2008, MT & TI; 7 males, 3 females, 3 pupae, type locality, 26.XI.2008 (larvae), reared and emerged (or fixed) in IV.2009, TI; 2 males, 6 females, near Yosakoi-toge, 1400 m, Saijo-shi, 18.V.2004, K. Nio; 23 males, 10 females, *ibid.*, 20.V.2008, MT & TI, S. **Ehime**: 11 males, 4 females, small stream, Yurano-no-mori, Kuma-kogen-cho, 30.IV–10.VI.2007, E. Yamamoto, M.

Etymology. The specific epithet refers to the type locality.

Habitat. Larvae live in roots of wet semi-aquatic plants at and near hygropetric habitats in mountain areas.

Distribution. Japan, Shikoku (Kochi, Ehime).

Japanese name. Yosakoi-kakutsutsu-tobikera.

Lepidostoma konosense sp. nov. (Fig. 5)

Diagnosis—The male of this species resembles that of *L. yosakoiense*; however, it clearly differs as follows: the lateral arm of male segment X are directed ventro-laterad in this species, but dorsocaudad in *L. yosakoiense*.

Description—**Adult** (Figs 5A–G). Brown to black. Body 5 mm in male and 5–6 mm in female. Antennae 8 mm in male and 8–10 mm in female, color and scapes of both sexes as in *L. yosakoiense*. Venation of hind wing variable individually even in same site (Fig. 5B). Other characters as in *L. yosakoiense*.

Male genitalia (Figs 5D–G). Segment X composed of paired mesal arms, paired lateral arms and median membranous lobe. Mesal arms short, round in lateral view. Lateral arms developed, heavily sclerotized, directed postero-caudad basally, each abruptly curved ventro-laterad at basal 1/3, with 2 setae subapically. Membranous lobe thick, length variable individually, from slightly shorter to little longer than mesal arms. Inferior appendages setose, long, each with apical 1/3 more slender than basal 2/3, subacute apically; superior hook slender, as long as 1.5 times length of basal width of inferior appendage. Phallicata thick, membranous at apical 1/2. Paramere slender and long, strongly sclerotized, acute apically.

Female genitalia. Very similar to those of *L. yosakoiense* and difficult to discriminate from each other.

Final instar larva. Length up to 6.5 mm. Head 0.80 mm wide. Size and characters as in *L. yosakoiense* and difficult to discriminate from each other.

Case. Cylindrical, sand case for early instar, changing to 4-sided leaf case at final instar. Length up to 8 mm.

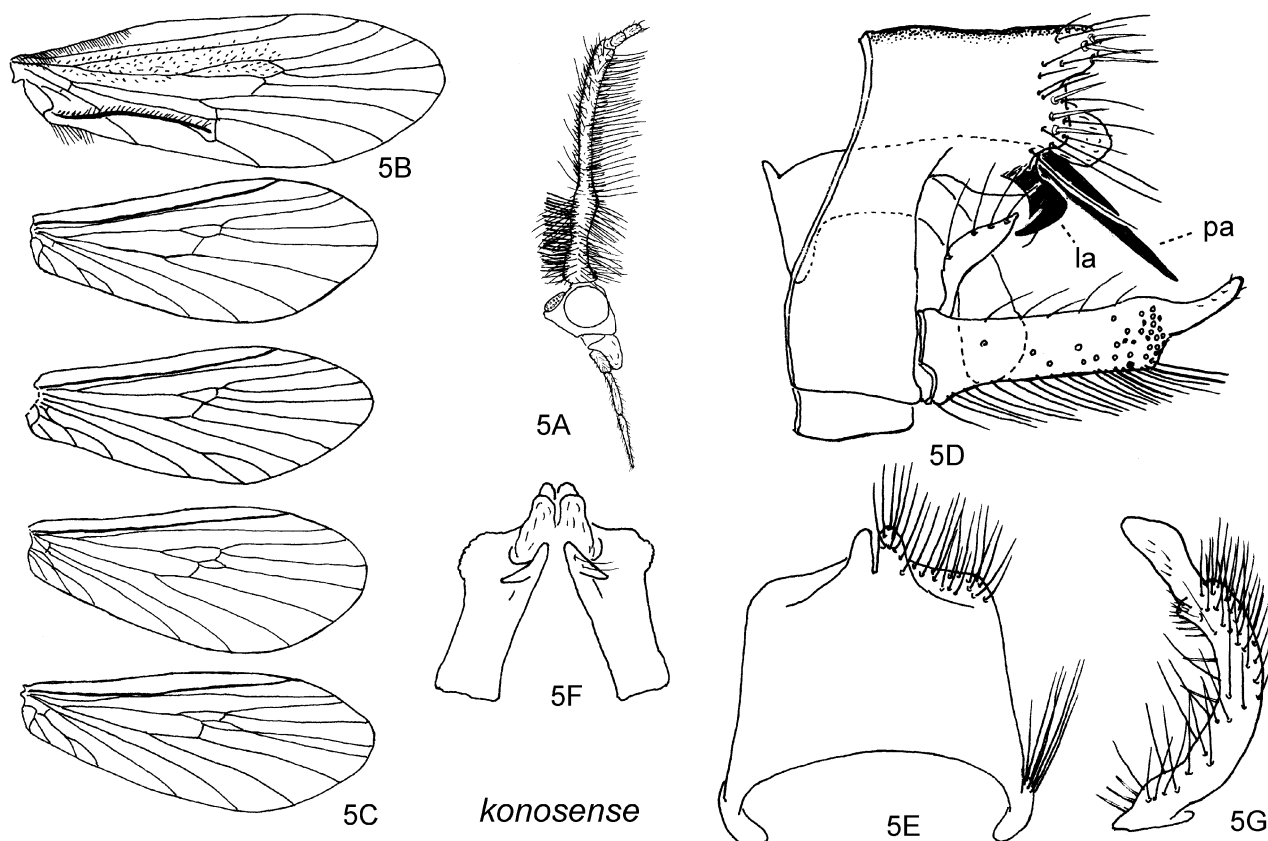


FIGURE 5. *Lepidostoma konosense* sp. nov. Male (A–F): A—head and basal parts of antenna, right lateral; B—right forewing, dorsal; C—right hindwing, dorsal, variation; D—genitalia, left lateral; E—same dorsal; F—mesal and lateral arms and membranous lobe of segment X, ventral; G—right inferior appendage, ventral. Abbreviations. Male: la= lateral arm; pa= paramere.

Type series (CBM ZI). Holotype male: JAPAN: Shikoku: **Tokushima**: hygropetric habitat, Konose-kyo, Naka-cho, Tokushima (33°47' N, 134°05' E), 600 m, 22.V.2008, MT & TI, S (CBM ZI 136844). Paratypes. 2 males, 2 females, same data as holotype (CBM ZI 136845–136848).

Other specimens (TI). Shikoku. **Tokuhsima**: 23 males, 4 females, same data as holotype; 4 males, 1 female, type locality, 11.V.2004, K. Nio. **Kochi**: 1 male, hygropetric habitat, Shiraga-toge, 1400 m, Monobe, Komi-shi, Kochi, 16.V.2008, T. Befu, L; 8 females, *ibid.*, 22.V.2008, MT & TI, S; 17 larvae, *ibid.*, 27.XI.2008, MT & TI; 1 male, 2 females, 25 pupae, 27.XI.2008 (larvae), reared and emerged (or fixed) in IV.2009, TI.

Etymology. The specific epithet refers to the type locality.

Habitat. Larvae live in hygropetric habitats in mountain areas.

Distribution. Japan, Shikoku (Tokushima, Kochi).

Japanese name. Konose-kakutsutsu-tobikera.

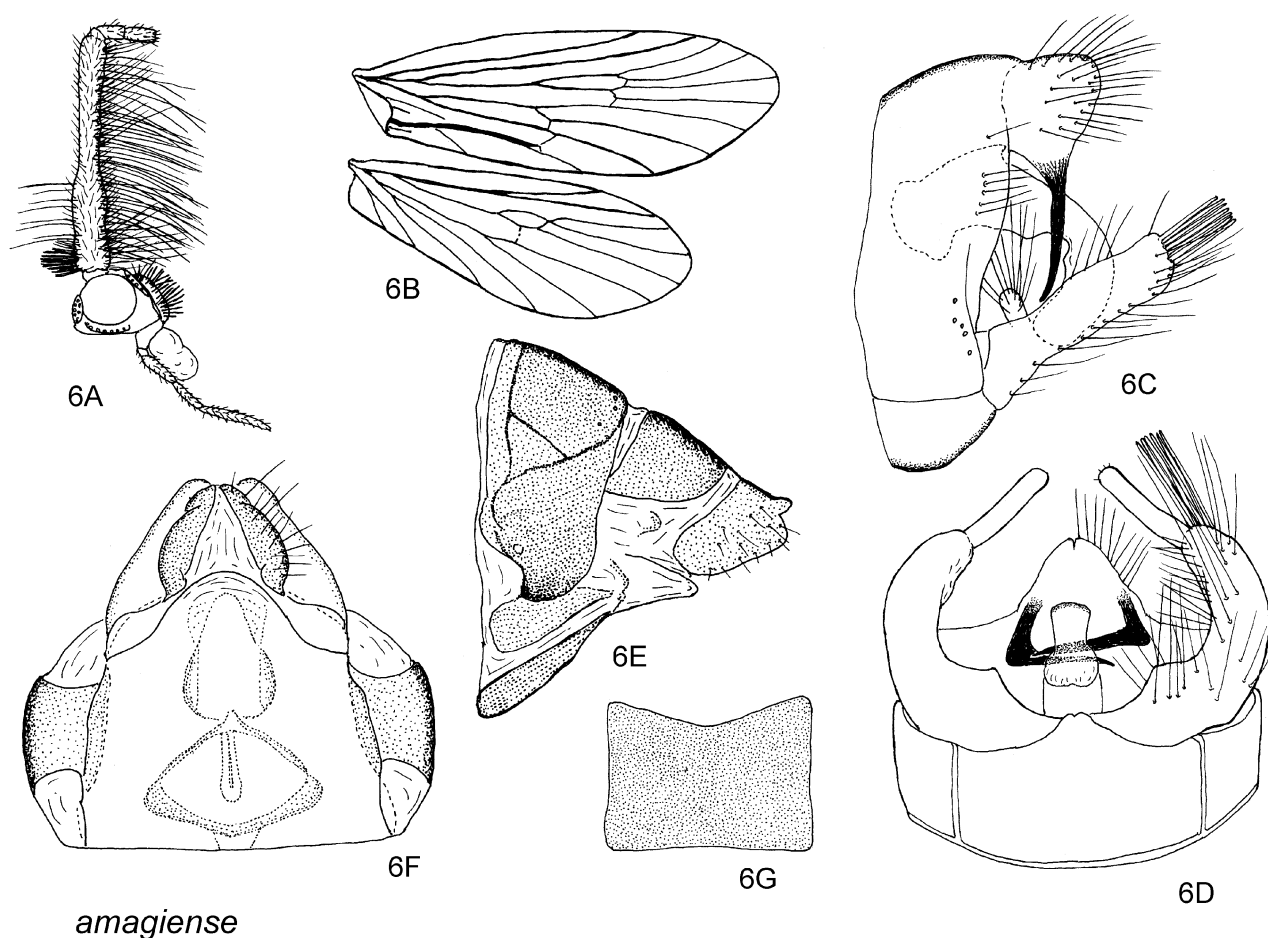
Lepidostoma amagiense sp. nov. (Fig. 6)

Diagnosis—This species clearly differst from other congeneric species by the unique male genitalia, in which slender long lateral arms of segment X are developed from the ventro-lateral margins of the mesal arms, directed ventro-mesad and crossing in ventral view.

Description—Adult (Figs 6A–G). Brown to black. Body 4–4.5 mm in male and 4.5 mm in female. Length of antennae unknown in both sexes due to specimen condition. Antennae: male scapes long, 3–3.5 times length of head, covered with long setae and short scales, each with basal 2/5 thick; female—long, about 3 times length of head, covered with short thin setae. Maxillary palpi: male—not segmented, 0.4 mm long and covered with dense scales; female—unknown due to specimen condition. Labial palpi 1.0 mm long, covered with thin short setae in both sexes. Wing venation as in *L. pseudemarginatum* sp. nov. Male with dense scale row on middle femur.

Male genitalia (Figs 6C, D). Segment X composed of paired mesal arms, paired lateral arms and median membranous lobe. Mesal arms short, subquadrate in lateral view. Lateral arms heavily sclerotized, slender and long, developed from ventro-lateral margins of mesal arms, directed ventrad at first and then curved mesad at middle, crossing in ventral view. Membranous lobe indistinct. Inferior appendages long, each with apical 1/3 thinner than basal 2/3, round apically, covered with many setae, 8–10 long and thick setae present on ventro-caudal edge of thick basal 2/3; superior hook short, 1/2 as long as basal width of inferior appendage. Phallicata thick, sclerotized at basal 3/4, broadly concave at middle of ventral margin in lateral view. Paramere absent.

Female genitalia (Figs 6E–G). Antero-lateral margins of tergite VIII gently curved caudad and strongly sclerotized. Lateral plates thin, triangular. Subgenital plate square with concave anterior margin. Tergites IX and X separated. Vaginal apparatus weakly sclerotized, lozenge without lateral projections. Lateral bands weakly sclerotized, subtriangular.



amagiense

FIGURE 6. *Lepidostoma amagiense* sp. nov. Male (A–D): A—head and basal parts of antenna, right lateral; B—right wings, dorsal; C—genitalia, left lateral; D—same ventral. Female (E–G): E—genitalia, left lateral; F—same, ventral, subgenital plate omitted; G—subgenital plate.

Larva. Unknown.

Type series (CBM ZI). Holotype male: JAPAN: Honshu: **Shizuoka**: small stream, Amagi-san, Yugashima, Izu-shi (34°50' N, 138°57' E), 600 m, 4.VI.1989, TH, S, pinned (CBM ZI 136849). Paratypes. 2 males, same data as holotype, pinned (CBM ZI 136850–136851).

Other specimens (TI). Honshu. **Shizuoka**: 3 males, same data as holotype, pinned; 1 male, 2 females, Suisho-chi, 720 m, Yugashima, Izu-shi, 4.VI.1989, TH, S; 3 males, Sugehiki-gawa, 850 m, Sugehiki, Izu-shi, 16.VI.1996, TH, S. **Yamanashi**: 1 male, small stream, 1650–1750 m, Noro-gawa, Ashikura, Ashiyasu, Minami-arupusu-shi, 21.VII.1991, TH, pinned.

Etymology. The specific epithet refers to the type locality.

Habitat. Adults were collected from small streams in mountain areas.

Distribution. Japan, Honshu (Shizuoka, Yamanashi).

Japanese name. Amagi-kakutsutsu-tobikera.

Acknowledgements

I am sincerely grateful to Naotoshi Kuhara, Chitose Board of Education, Takao Nozaki, Ninomiya-cho, Kanagawa, Toshio Hattori, Shizuoka-shi, and Hiroyuki Nishimoto, Komaki-shi for their gift of many valuable specimens. My thanks are also due to Mikio Takai, Konan-shi, Kaori Nio, Tosashimizu-shi, Takamori Befu, Kochi-shi, and Eiji Yamamoto, Yamamoto Institute of Forest Biology, for their gift of specimens and help on collecting trips, and to Tochigi Prefectural Museum, for the loan of *L. yunotaniense* specimens.

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